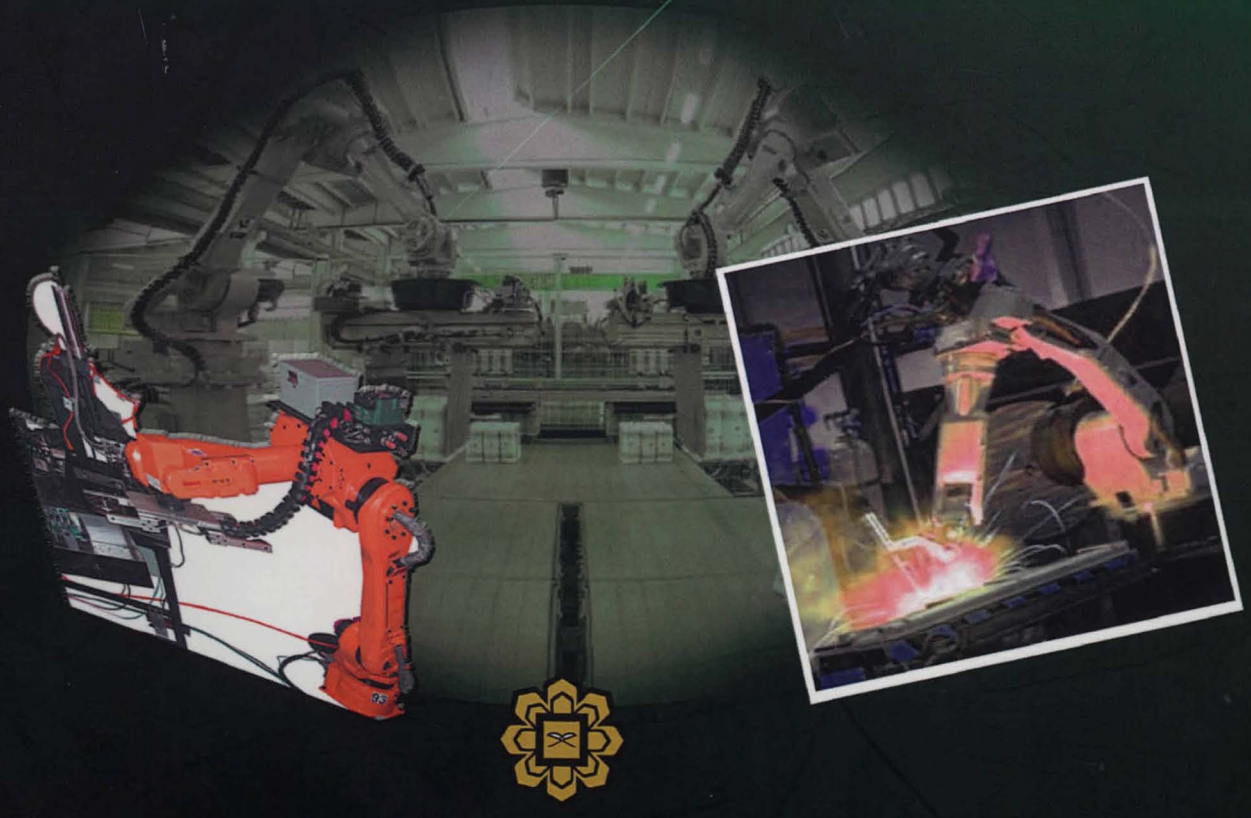
MECHATRONICS BOOK SERIES

ROBOTICS AND AUTOMATION

Rini Akmeliawati
Wahju Sediono
Nahrul Khair Alang Md. Rashid



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CHAPTER 21

Design and Development of Interactive Fish Robot

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21.1 Introduction

In recent years, bio-inspired robotics field has grown as a challenging new research topic. The aim is to develop robots which combine bioscience and robotics. Fish-like robots can be considered as bio-inspired underwater robot. Like other underwater robots it can be used in the fields of ocean development, ocean investigation, and marine environmental protection as well as entertainments. Fish robots must have the similar characteristics of underwater robots and additional higher efficiency and propulsive performance as well as fish like performance. This chapter describes a step-by-step method of the development of a fish robot. First the mechanical structure based on the simple model of a fish was developed and then suitable actuators, sensor and control system added. Finally the performance was tested by simulation with MATLAB and in a (swimming) pool.

21.2 Mechanical Structure

The body of the robot is made of aluminum. It consists of three segments. Each segment has three servo motors to move the robot. The head is made of plastic and wrapped with the fiber glass. The total weight of the whole robot including the electronic components is estimated to be 3 kg.

The system architecture of the robot is shown in Fig. 1. It consists of a body which is the head, the body and the tail.

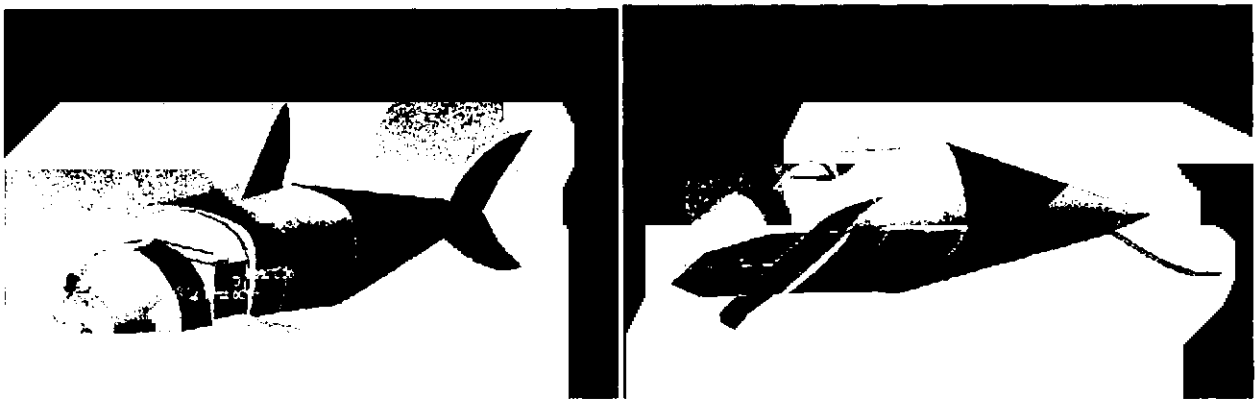

Fig.1 3D design

21.3 System Mechanism

For simple structure and easy control of the fish robot, a simple model of fish is considered where the fish robot swim by moving only the tail, although the real fish move using not only tail fin but also pectoral fins or ventral fins.